

Dear reader,

TOF Magazine team welcomes you to the new year 2023 and wishes you good tidings and prosperity in your farming activities. TOF Magazine continues to be your companion in discovering new approaches to farming that not only lead to higher yields, but also help reduce the cost of production while ensuring that the food you harvest from the farm is safe for consumption.

As you prepare your land for this planting season, this edition comes with tips on seed selection and new organic farm inputs that could change your fortunes in the farm, among other new technologies. The edition also features one model school from Eastern Kenya, which is exemplifying the life changing benefits of agroecology in a school set up.

Read on and draw inspiration from a champion organic farmer, who diarizes her journey of embracing agroecology and in the process, establishing an organic shop that is creating market opportunities for small scale organic farmers, and access to organically grown foods to local consumers.

In the spirit of innovativeness, TOF Magazine has reinvented its production model. Beginning this month, you will be receiving the magazine bi-monthly, with more informative articles spread out in 12 vibrant pages. *Enjoy the read!*



IN SEASON

Seed selection is key in ensuring high productivity

By Charles Kimani

Even though the weatherman has predicted low rains, it's important for farmers to ensure that they are ready by preparing their land early and ensuring they have the right seeds

THE RAINY SEASON is upon us, and farmers are already preparing for the planting season. Even though the weatherman has predicted low rains, it's important for farmers to ensure that they are ready by preparing their land early and ensuring they have the right variety and quality seeds.

Determining the quality of seeds

The quality of seeds will determine the amount of yields when harvest time comes. Key attributes of quality seeds include:

- Uniform variety
- Viable (ability to germinate)
- Free from seed-borne diseases and pest damage
- Free from inert/foreign materials
- Not shrivelled, mouldy or cracked
- Not rotten or discoloured.



Super Hybrid Napier - Pakchong

Read about *Pakchong's* advantages over its parent species, including higher yields, better resistance to pests and diseases, and greater tolerance of drought and flooding. PAGE 11

IN SEASON

Seed selection tips

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Seed Selection

When it comes to seed selection, farmers can decide to use seeds from the previous harvest or purchase seeds from local input suppliers.

Using seeds from previous harvest

To use seeds from the previous harvest a farmer has to be deliberate and start selection early. The first step is identifying the seeds to use. This is done when the crop is still on the farm. The farmer should note the seeds that germinate and flower fast. These are the seeds that should be selected and stored as they will give optimum yields. If stored well, seeds can last for a long time without losing their ability to germinate. The best way to achieve this is by storing them in a dry and airtight container. When a farmer is saving seeds, they should consider the amount of heat and light to which the seeds are exposed as too much heat can cause changes to the seed, especially if they contain moisture. It is also important to consider the damage caused by animals such as rodents and squirrels. To keep these away, store your seeds in a raised warehouse where the animals cannot reach. Remember, heat and moisture are favourable conditions for rodents to reproduce.

Purchasing Seeds

Farmers who decide to purchase seeds should consider the following factors:

- Seed lot numbers to allow for easy traceability of seed lot in the event of crop failure
- Weight of the seeds
- Name of the crop species and variety
- Packaging date
- Seed merchant/company
- Labelling and sealing of the containers or packets is done in such a way that seeds cannot be removed without damaging the seal or label. (The seeds should be packed in an air tight container).

Use certified seeds

Apart from the mentioned qualities, it's important for farmers to use certified seeds. Certified seed is seed that has met the standards set out by KEPHIS. The use of certified seeds has many advantages:

- Certified seed results in high yields provided all the other factors of production (good soil fertility, conducive climatic condition and all other factors of production are favorable).
- Having undergone a rigorous process to ensure quality, certified seed is more agile and responds better in resistance to pests and diseases.

Having learnt the importance of proper seed selection, farmers should strive to purchase seeds from credible input suppliers. Below is a list of some of the input suppliers where you can get certified seeds.

Input Supplier	Contact	Input Supplier	Contact
Kenya Seeds	0722205144	East African Seeds	0722207747
Simlaw Seeds	0722200545	Advanta seeds	0799835429

ORGANIC PRODUCTS

A Biological Fertilizer, Mazao Flourish

Plants that have been enriched with *Mazao Flourish* have an accelerated growth as compared to those planted with conventional fertilizers or without any at all

By Ann Wairimu

THE EFFECTS OF climate change are evident in every aspect of life. On a usual day in January a few years back, the temperatures would averagely be 26 degrees Celsius, but now temperatures get as high as 31 degrees Celsius in some parts of the country. Years back, farmers could forecast when to expect the rains, but all they do now, is till their lands and plant as soon as the first rain drop hits the ground.



The unfortunate thing is that we have in one way or the other contributed to this drastic change in climate globally. This is majorly through greenhouse gas emissions, deforestation, air pollution from manufacturing industries and vehicles and so many other factors. Over reliance in synthetic chemicals in food production has also had adverse effects on the environment and consequently contributed to the change in climate. That is why we need to come up with solutions to reduce application of synthetic inputs in the farm.

Real IPM is one of the major organic farm input suppliers in the country and for the last 20 years it has been producing biological farming solutions that preserve and protect the environment, the farmers and the food consumers. Our Research and Product Development departments are continually innovating biological solutions to various pests and diseases. We produce biopesticides, predatory mites that feed on crop pests, biofertilizers, as well as physical solutions such as traps and pheromones at our Thika and Embu farms. Our products are based on living organisms. These can either be microorganisms occurring naturally in the soil or predatory mites found in the wild.

Mazao Flourish

One of the products that we pride ourselves in, is our biofertilizer, Mazao Flourish. This is a liquid bio-fertilizer that contains a mixture of beneficial microbes which are living organisms. It promotes growth by increasing the supply of primary nutrients to the plant and increases

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es root development which increases yields by up to 30%.

This product has been tried and tested and farmers who have used it testify of its effectiveness in increasing productivity. Seed dormancy is a challenge that farmers continuously experience, and this necessitates them to incur an extra cost of purchasing more seeds in order to replant. From the many trials we have conducted and farmers' testimonials, Mazao Flourish guarantees farmers 99% germination rate. Once a farmer uses Mazao Flourish, there is no need to purchase extra seeds for replanting as almost all seeds germinate.

Minimizes root disease damage

The microbial mix composed in Mazao Flourish minimizes disease damage from several root rot fungi and fungal like microbes including Fusarium, Phythium, Rhizoctonia and Botrytis. We have encouraged onion farmers to use Mazao Flourish in the nurseries as well as during transplanting since, that is the stage most prone to root rot. Mazao Flourish destroys the harmful components from the soil which causes diseases in plants.

Mazao Flourish increases germination rate and promotes seedlings vigour. Plants that have been enriched with this product have an accelerated growth as compared to those planted with conventional fertilizers or without any at all. What also attributes to this development is the uptake of nu-

trients from the soil by the crop since the roots are free from diseases that inhibit free absorption of nutrients from the soil.

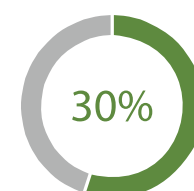
Bigger roots mean the crop can get a lot more nutrients from the soil and this is exactly what Mazao Flourish does. It helps the plant to overcome environmental stresses through increased root development. Our research has shown that crops planted using Mazao Flourish have bigger roots than those planted without.

With the availability of water and all these benefits of Mazao Flourish combined, the farmer enjoys an increase in productivity. Mazao Flourish restores normal fertility to the soil and makes it biologically alive. It also retains the soil's PH, meaning there's no need for the use of agricultural lime to the soil.

Farmers can use Mazao Flourish as a stand-alone fertilizer for as much as they use it from the beginning as a bio primer and later on as a drench. It is important to note that the earlier Mazao Flourish is introduced, the better the results will be experienced as all the above-mentioned benefits are beneficial to the young crop.

Mazao Flourish can be used on different crops such as potatoes, maize, beans, french beans, tomatoes and vegetables like cabbage, spinach, sukumawiki, and kunde. You can reach us on 0725 806 086 or visit our farm in Madaraka, Thika to learn more about what we do.

Real IPM appreciates the financial support of the European Union and SlovakAid through the AgriFI Kenya Challenge Fund which is managed by Self Help Africa. They are supporting us to market this amazing product to smallholder farmers.



Yield increase of the liquid bio-fertilizer which promotes growth by increasing the supply of primary nutrients to the plant and increases root development



Ann Wairimu is the marketing manager at Real IPM (K) Ltd

NEW TECHNOLOGIES

How to use soilless media to plant seedlings

The soil-less media is put into planting trays and seedlings are allowed to germinate under greenhouse conditions. The media provides an environment likened to that of soil for the seed to germinate and develop

By **Mellen Nyabuto**

FOR MOST FARMERS, getting access to clean planting material (healthy seedlings) is a great challenge. The health state of the seedlings before transplanting is very key. A healthy seedling is highly likely to have a higher survival rate, produce more and be less affected by pest and diseases. For most farmers in Kenya they either develop their own seedlings or buy seedlings from seedling producers for crops that can be transplanted. Examples of crops that can be developed into seedlings for transplanting include: most vegetables such as the brassica family, spinach, onions, tomatoes, fruit trees such as paw paw, avocado, passion, mango e.tc.

The conventional way for seedling propagation in Kenya for most farmers is through soil seed bed (seed nurseries) propagation.

However, there is a new technology farmers can employ in propagating seedlings. Contrary to the conventional way, this method uses soil-less media as the medium of growth. The soil-less media is put into sizeable planting trays and the seedlings are sowed singly and allowed to germinate under greenhouse conditions. The media provides an environment likened to that of soil for the seed to germinate and develop. Some of the examples of the soil-less medias that can be used include; peat moss, pumice, sawdust, vermiculite and coco peat. Some of these soil-less media can be obtained in ready-made form from companies such as ocean agriculture or organic fertilizer companies. Benefits of using soilless media include:

1. The media provide disease free environment for the seedlings to germinate
2. Germination percentage is higher
3. Reduces seedling mortality rate
4. Ensures uniform germination rate
5. Easy to carry out management practices
6. Root system of seedlings is robust and intact eliminating effects of transplanting shock.

Besides being a healthier way of seedling production, this kind of propagation can also be a lucrative source of income and employment. However this type of propagation system will require the farmer to have most preferably a greenhouse structure or good shed structure. Below are the steps that can be followed in order to develop seedlings in soilless media in a greenhouse seedling propagation unit.

1. **Prepare the material to use:** Materials that may be needed may include seedling trays, water, and calcium nitrate as treating agent for coco peat media. Coco peat is the most preferred medium since it's affordable and easily accessible. However when purchasing this medium, the farmer should be keen to inquire whether it's treated or not. Using untreated coco peat can result to poor germination, scorching effects, and stunting in plants leading to losses.
2. **Treat untreated coco peat;** This is done by soaking the coco peat in water for 15 minutes to loosen and hydrate it; Adding calcium nitrate (for every five kilograms of coco peat one can use up to a spoonful of calcium nitrate) which displaces the unwanted salts in the medium and stirring the mixture well and leave for 24 hours.
3. **Plant the seeds:** Put the media on the tray and make small holes for sowing the seeds and plant the seeds on media in the holes. Ensure to cover the seeds using the coco peat media.
4. **Label the trays for easier identification:** Information such as date of sowing, crop, variety, and quantity can be included in the labelling.
5. **Place them in a germination chamber:** The duration in the chamber will depend on the type of crop, some can take up to 3 days in the chamber. The trays can then be moved to the greenhouse set up.
6. **Transfer the seedling trays into the greenhouse set up:** Inside the green house the trays should be placed on raised wood or mesh beds. The seedlings are maintained by watering daily, and ensuring nutrient supply and pest manage-



ment. When watering the pressure should be kept low to prevent disturbing and splashing of the media.

Once the seedlings have matured, they can now be transferred to be transplanted in the soil. Most greenhouse seedling propagators raise the seedlings for commercial basis. They sell to farmers who then plant them. Farmers can easily access the seedlings from this propagators from their propagation units. For this commercial purposes, the propagation unit has to be registered and certified by the Kenya Plant Health Inspectorate Service (KEPHIS).

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ENVIRONMENT

Regenerative agricultural practices for sustainable and resilient crop production

What farming practices can farmers embrace to achieve high crop yield and generate income amidst increasing challenges of climate change and soil infertility?

By **Grace Kinyanjui**

THE PRESENT-DAY crop production in Kenya has become very vulnerable to the effects of climate change because of heavy reliance on rain-fed agriculture. Unpredictable weather patterns with insufficient rainfall and prolonged dry seasons are now the new normal. Another critical concern among our farmers is the declining soil fertility resulting from continuous cultivation, poor soil management practices, lack of proper cropping systems, and soil erosion. Despite these challenges, our farmers must be very resilient and adequately prepare their farms for the next major planting season starting mid-March with the arrival of long rains. What is more, the Kenya Meteorological Department has forecasted that the expected long rains in April will be below average in most parts of Kenya.

This begs the question, "What farming practices can our farmers embrace to achieve high crop yield and generate income amidst increasing challenges of climate change and

soil infertility?"

Key practices include:

- **Conservation tillage:** Low or no-tillage practices are encouraged to minimize physical disturbance of the soil, build both soil structure and health, conserve soil moisture, and control soil erosion. Commonly used conventional tillage practices during land preparation like burning, deep ploughing, and overturning soils should be avoided at all costs as they lead to soil degradation.
- **Crop rotation:** Every farmer should have a crop rotation plan to avoid repeatedly planting the same crops in the same area. When selecting the crops for rotation, consider the plant family, plant root system, impact on soil fertility and structure, compatibility with other crops, and marketability. For example, legume-based rotations increase soil fertility. Other benefits of a good crop rotation practice include improved soil structure and reduced pest and disease pressure.
- **Diversification of crops:** Intercropping and agroforestry practices improve soil health and enhance biodiversity. Common types of intercropping include mixed or row cropping of cereals with legumes, companion planting of vegetables, and push-pull cropping of maize, Napier grass, and Desmodium legume. The inclusion of agroforestry trees



like Calliandra, Neem, fruit trees, and other indigenous tree and plant species is encouraged to conserve soil moisture, create a favourable microclimate for crops to thrive, and also help mitigate the effects of climate change.

- **Use of cover crops:** Bare soil is bad soil as it is vulnerable to erosion and gradual loss of fertility. On the other hand, a good ground cover ensures that the soil is always protected from nutrient leaching and erosion, helps in nutrient cycling, and improves soil structure and fertility. Cover crops can either be intercropped or planted after harvesting the main crop. The common cover crops include legumes, forage grasses, and broad-leaf vegetables like brassicas.
- **Mulching:** Dry mulching helps to retain soil moisture by preventing water evaporation, and suppresses the growth of weeds. The bare soil between crop rows is usually covered with a layer of loose material such as crop residues, dry grass, slashed weeds, or biodegradable plastic mulch. Crop residues have the added advantage of serving as manure

during the succeeding cropping seasons.

- **Composting:** This is a key component of sustainable agriculture. Farmers keen on regenerative farming should have several heaps of well-composted farmyard manure to replenish depleted soil nutrients and optimize crop vigour. Manure is a rich source of nutrients like nitrogen, phosphorus, potassium, calcium, and magnesium and also increases the soil's organic matter.
- **Integrated farming system:** Farmers are urged to shun monoculture farming and instead embrace integrated biosystems with a mix of enterprises such as crop and livestock production, fish farming, and beekeeping. While animals are a source of manure, bees will enhance crop pollination for better yields.
- **Water harvesting practices:** Because of the changing climatic conditions and erratic rainfall patterns, farmers are encouraged to maximize the available rainwater through water harvesting and conservation techniques. These include terracing, rooftop water harvesting, small-scale irrigation dams, water pans, earth basins, and planting pits. During dry seasons, storage reservoirs and tanks increase the availability of water for domestic and agricultural uses.
- Other crucial practices include soil analysis to know the soil nutrient requirements; use of high-quality and certified seeds; selection of early maturing crop varieties that can yield good harvest amidst shortened rainfall patterns; timely planting; proper spacing; integrated pest management (IPM) and reduced reliance on synthetic inputs such as inorganic fertilizers, chemical pesticides, and herbicides.

Grace Kinyanjui is a research fellow specializing in agricultural entomology, IPM, and sustainable crop production.



LEARNERS' CORNER

Child malnutrition in Kenya: is permaculture the solution?

Food and nutrition insecurity is a major challenge; caused by low food production, lack of diversified source of income and poor management of the country's food system

By Purity Wanjiru

EVERY CHILD HAS a right to access adequate food of acceptable quality and to be free from hunger, access quality education and also live in a clean, healthy environment.

Kenya is an agricultural country with a capacity to produce adequate food to feed the entire population of 50 million people. However, food and nutrition insecurity is a major challenge; caused by, low food production, lack of diversified source of income and poor management of the country's food system.

This situation forces children from vulnerable households spend whole day in school with empty stomach, without having taken either breakfast, lunch or even accessing safe drinking water, and only walk back to food insecure homes. In such situation, families survive with only one meal per day, which is normally dinner. This situation affects school going children's health, growth and academic performance, as they spend some days out of school.

Currently, there are increased cases of conflict between human beings and wildlife in arid and semi-arid regions, as they compete for meager resources like water and grass. All this is because of prolonged dry periods, destruction of water catchment areas leading to loss of vegetation and drying of rivers.

In agricultural potential areas, there is increased over use of chemical farm inputs, leading to pollution of water bodies, food contamination and poor waste management, all contributing to increased effects of climate change.

To address the above problem, SCOPE Kenya has been supporting the affected school's community to redesign their ground and use available land to establish sustainable productive land scape with food forest and cool micro climate which is condu-

cive for learning.

SCOPE Kenya is a local capacity building and networking Organization, which promotes permaculture/ agroecology practices in schools to enhance sustainable land use for food production, income generation and conservation of natural resources, for the betterment of future generations.

Through Katoloni Mission CBO in Machakos, a member organization of SCOPE Kenya, and in partnership with Biovision Africa Trust, Kavyuni Primary School located at Kalaira sub-county in Machakos County has been one of the beneficiaries.

"Being in a dry region, Kavyuni has been one of the communities hard hit by droughts as the scorching heat of the sun has left most farms bare and affected the school going children as there is inadequacy of food among families," says Ms Priscilla, the school headmistress.

SCOPE Kenya in partnership with Biovision Africa Trust have trained the teachers and pupils in this school on agroecology, and climate smart technologies. "Through these trainings, we now have a food forest and plenty of vegetables such as spinach, managu, terere and kales; different types of fruits such as papaws, bananas, and avocados and different types of herbs such as moringa, neem among others," she says.

The learners have taken full responsibility of learning more about agroecology, practice it in school and extend the skills in their homes. Kavyuni is also used as a demonstration center especially to visitors who want to learn these practices.

Other partners such as Africa Sand Dam have come on board to enhance the success of these efforts by building a tank that holds 120,000 litres of water for the school to harvest water during the rainy season.

Ms Priscilla acknowledges the benefits of these collaborations in enabling the school overcome challenges of drought. "Indeed, most of the hardships encountered by learners especially on dusty playgrounds, lack of food and clean water to support learners and teachers due to low productivity of school farms, can be solved if schools were more equipped with knowledge on agroecology," she says, further adding that it is an effective way to fight hunger and malnutrition.

120,000

Capacity of tank procured by partners for the school to harvest water during the rainy season.

Purity Wanjiru is the resource mobilization and documentation Officer at SCOPE -Kenya



FARMER'S TESTIMONIAL

A farmer uses parasitoids to manage fall armyworm in Maize

Parasitoids are natural enemies of destructive pests, which feed on the eggs and larva of the fall army worm, hence stopping them from multiplying

By Miriam Makato

MR. PIUS NDIVO, a farmer from Kangundo-Kitwii village, Machakos County, is an ardent reader of *The Organic Farmer magazine*, and has worked with Ms Miriam Makato, a field officer at *Biovision Africa Trust*, based in Kangundo, in growing his crops organically. Among the crops he grows include: beans, pigeon poeas, coffee, grafted mango and bracharia grass. "Farming is rewarding especially when all the agronomic needs of the crop are easily met," says Mr Ndivo. He however acknowledges that poor rainfall and persistent pests are the major challenges encountered by farmers. To produce crops in drylands one has to have information on best crop varieties that are drought resilient. For Pius, being linked with *Kenya Agricultural Livestock Research Organization (KALRO)* has helped him to beat this challenge of poor rainfall, as he can now get drought resistant seeds especially for the staple crop, maize. "Pests and diseases were not a major maize production problem until the year 2017, when the first case of fall armyworm attack was reported in Kenya," he recalls. After a long time of losses resulting from attacks by this ravaging pest, Pius almost gave up maize production. Fortunately, two organizations; Biovision Africa Trust and Plant Village had launched initiatives to help farmers tackle the fall army worm in his area; and he was lucky to be one of the farmers selected for training.

About the fall army worm

The fall armyworm attacks maize, sorghum, and sugarcane. As a new pest, most farmers have been having a challenge in identifying and managing it. Researchers have been working on understanding the nature and lifecycle of the pest, to come up with ways of effectively dealing with it.

The fall armyworm has some notable characteristics. The adult moth is very mobile and can easily fly up to 100 km in one night. The pest feeds on different plant species and crops and can easily spread across different crop species. It is also a profile breeder has a lifecycle of 30 days during the warm weather. An adult female can lay 100-200 eggs per egg mass, 1500-2000 eggs in her lifetime, and reproduce 12 generations in a year. The fall army worm population spreads fast in a large area and can't be controlled by a single hit. Farmers should control the egg masses at farm level.

Resistance to pesticides

Before the training, Pius used various methods to control fall armyworm. He would apply chemicals such as Ortho and Bug B Gone, but the pest developed resistance to these chemicals. He then tried physical methods such as suffocation using



soil, and other methods such as spraying tobacco and soap solutions but the pest still caused extreme losses. His once productive farm produced very low yields that could not even cater for household consumption.

Use of parasitoids

Pius attended a field day organized by Plant Village and *Biovision Africa Trust*, where he was trained on how to use parasitoids along other integrated pest management approaches to manage FAW. Parasitoids are natural enemies of destructive pests, which feed on the eggs and larva of the fall army worm, hence stopping them from multiplying. Plant Village is a non-governmental organization Based in Busia. They educate farmers on fall Armyworm Management. Through Dream Team Agro Consultancy Limited and USAID's Current and Emerging Threats to crops, Plant Village has established a parasitoids rearing Lab at Alupe University in Busia.

a) Farmers observing parasitoids during a field day organized by Plant Village and BvAT

BvAT has been working with Plant Village to sensitize farmers on the advantages of using parasitoids in combination with the cultural and physical methods of fall armyworm management.

During the 2022 October-December rains, BvAT visited Pius' farm and placed six cards containing parasitoids in the maize farm at different locations. After every two weeks, the population of the parasitoids was boosted, and this was highly effective in managing the ravaging pest as the FAW population drastically reduced. One card of loaded parasitoids costs Ksh3000 and these can be obtained from Plant Village, Busia (contacts are provided below).

b) Placing parasitoid cards in the farm

With the use of parasitoids, the fall armyworm population during the October –December rains was much less as compared to the previous seasons. Even with little rainfall received, maize in Pius' farm still managed to fruit, as compared to other farms where parasitoids were not introduced. Parasitoids are under the biological methods of pest control; hence using them in the farm is purely organic. Farmers need to embrace the use of parasitoids in their farms to minimize pest populations to remain food secure especially in the face of climate change.

Miriam Makato is the Field Officer at Kangundo Resource Centre.

SYLVIA'S DIARY

My journey with Agroecology

Farming using agroecological principles creates a natural balance and the soil thrives, pests tremendously reduce, and produce ultimately increases

By Sylvia Kuria

MY FIRST INTERACTION with the term Agroecology was in 2018 when I read about it in a WhatsApp group. Members discussed how organic farming needs to transition to broader farming practices that are not just about growing crops without synthetic inputs but carrying out their farming activities in a way that they are conscious of the health of people, animals, soil, and local systems. This will ensure that we are well fed not just for today but for many generations to come.

I have interacted with lots of farmers all over Kenya and even on the African continent and all of them are committed to growing safe food and farming sustainably but feel the options are extremely limited. Farmers are struggling with production and when they have problems, especially with pest management, they have the agrovets as their "advisors." Agrovets sell the "magical formula" that will sort out all their problems. The main problem with this approach is that neither the agrovet nor the farmer read the ingredients on the packet to know the impact of the substances on their health as well as the health of plants and biodiversity.

This trend of ignorance has landed us where we are today. Our soils are acidic, we have superbugs that do not respond to synthetic pesticides, bio-diversity is threatened, our health is severely compromised and our harvests are much lower.

The final straw for me that made me choose organic was when I planted tomatoes in my kitchen garden. The tomatoes were doing pretty well until they started fruiting. I then noticed small white flies all over the tomatoes, the leaves were discolored and some plants would just wither and die. Other leaves were filled with aphids and spider mites as I came to learn later on. I then proceeded with a sample of a leaf and fruit to my "advisors" at the agrovet. As usual, they gave me the "solution" which I was to spray every 3 days. I followed instructions to the letter but noticed little improvement. The white flies increased and the poor state of the plants persisted. My agrovet advisors in the coming days advised me to try different concoctions which never worked and eventually I was left with poisonous tomatoes to feed my family.

I went online to search for a better way to grow food and I remember I googled "farming without chemicals" organic farming appeared on my screen and that is how my journey as an organic farmer began. My story is not unique, many farmers are going through a myriad of challenges with their farms and are wondering how to move to organic and more sustainable farming systems. In my case, I slowly started avoiding synthetic farm inputs when planting and learning various ways to make organic manure on the farm; I approached organisations who train farmers on integrated pest management, and the more I sought, the more I discovered



that options are out there. I adopted use of traps, home made biopesticides, cropping techniques that reduce pest population among other approaches. Now, I can confidently say that farming organically using agroecological principles, creates a natural balance and the soil thrives, pests tremendously reduce, and, produce increases. I have been growing various vegetables and other crops alongside dairy keeping and this journey has been a fulfilling one.

In 2016 I took a step of faith and started selling my vegetables from my farm to family and friends in Nairobi. Sylvia's Basket was born as a home delivery organic basket business. I then opened our first outlet in November 2019 selling produce from my farms as well as enabling smallholder farmers to access markets for their products at our outlet. Our vision as Sylvia's Basket is to break the barriers and make organic food accessible by ensuring it is affordable. We also strive to work with smallholder farmers, even those with a 1/8 of an acre to access a reliable market for their farm produce all year round.

This year I will be sharing with you my journey on how I practice agroecology. I will share my diary on how I practice different agroecological principles. On my journey, you will realize that it is not difficult to farm sustainably, pests can be controlled using safe methods and farmers can make a decent income growing safe organic produce. I hope to encourage farmers in Africa that it can be done. I know many of us are already farming sustainably and I hope my diary will resonate with you too.

Sylvia Kuria is the proprietor of Sylvia's Basket, an outlet shop for organic produce based in Limuru. Sylviakuria@gmail.com

ANIMAL HEALTH

Super Hybrid Napier Grass-Pakchong

The hybrid has a number of advantages over its parent species, including higher yields, better resistance to pests and diseases, and greater tolerance of drought and flooding

By Susan Wanjiru

THE SUPER NAPIER grass also known as Pakchong or Hybrid Napier is an interspecific hybrid of two species native to Southeast Asia. It was first developed in Thailand in the late 1960s by culturing the tissue of the pearl buckwheat tree with the African Napier grass. The resulting hybrid has a number of advantages over its parent species, including higher yields, better resistance to pests and diseases, and greater tolerance of drought and flooding. The origin of Super Napier is attributed to the efforts of Thai researchers who were looking for ways to increase food production in the region. This hybrid has since become widely used as a fodder crop in many parts of the world.

Characteristics

The Super Napier grass is a highly productive grass with a long leaf length of 6-8cm, capable of producing up to 20 tons of dry matter per hectare which can be harvested 7-8 times a year. Once planted, the grass can provide high yield for 7-8 years continuously with a harvest of 180-200 metric tons of green succulent grass per acre annually. The yield is twice that of ordinary Napier grass. The Super Napier grass is resistant to pests and diseases. The grass is also very palatable to livestock, making it an ideal choice for animal feed. In addition, this hybrid grass is more tolerant of both drought and flooding than either of its parent species, making it well suited for cultivation in areas prone to extreme weather conditions.



Nutritional benefits of Super Napier

Super Napier is a nutritious and healthy grass that provides many essential vitamins, minerals, proteins, and carbohydrates. It is an excellent source of dietary fiber, which helps to reduce cholesterol levels in the body. Additionally, it contains high amounts of calcium, magnesium, iron, zinc, and other important trace elements. It also has a good balance of essential amino acids, making it a great choice for those looking to increase their protein intake. Furthermore, it is low in fat and calories, making it a great option for those trying to lose weight.

The vitamins found in Super Napier grass include Vitamin A, B1, B2, B3, B6, C, E, K, and folate. These vitamins are essential for proper functioning of the body and can help to boost immunity and improve overall health. The minerals found in this grass include calcium, magnesium, phosphorus, potassium, sodium, and zinc. All these minerals are important for maintaining strong bones and teeth, as well as helping to regulate blood pressure and heart rate.

Growing conditions

Soil type- Super Napier grows best in well-drained soils with a pH range of 5.5 to 7.0. It prefers full sun and warm temperatures, but can tolerate some shade. It is drought tolerant, but will produce more biomass if irrigated.

Land preparation- Before planting, the soil should be plowed and harrowed to a depth of at least 20 cm. If the soil is very dry, it should be irrigated before planting. The seedbed should be kept moist until germination occurs.

Growing from cuttings- Super Napier grass can be propagated from cuttings. Cuttings should be taken from healthy plants having been collected from 90-120 day old Napier grass with three nodes and planted directly into the soil at an angle of 45 degrees. The cuttings should be planted about 10 cm apart in rows spaced 30 cm apart, with an average of 6000-8000 cuttings required per acre. The cuttings should be watered regularly until they are established.

Harvesting and feeding

You can make your first harvest 90 days after planting. The succeeding harvests can be 45 to 60 days thereafter. The grass should be harvested when it reaches a height of 1.5 meters and the leaves have developed to full size. It is best to cut the grass with a sickle or scythe, as this will ensure that the stems are not damaged. After harvesting, the grass should be dried in the sun for two to three days before being stored in a dry place.

The grass can be fed to livestock either fresh or dried. When feeding fresh, the grass should be cut into small pieces and mixed with other feed sources such as hay, silage, or concentrates. The dried grass can be ground into a powder and added to animal feed rations. This type of grass is highly palatable and nutritious, providing high levels of protein, energy, minerals, and vitamin to livestock. For hogs, poultry, rabbits, plant-eating fish (tilapia and pangasius), and horses use, 45-day old growth, chopped or shredded. For larger ruminants like dairy cattle, beef cattle, give 60-70 day-old growth, also chopped or shredded. Shredded Napier can also be used for mixing with manure or any other substrate in vermiculture. The resulting vermicompost is said to have a high nitrogen content.

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NUTRITION

Rosselle; a nutritional and medicinal plant

IN THE ARTICLE PUBLISHED in Issue 209, December edition, there was an error about the part of Roselle (*Hibiscus sabdariffa*) used in preparing extracts and other food products.

The calyx (sepals) of hibiscus is commonly used in the production of soft drinks, juice, jelly, jams and wine. They can also be dried and brewed into tea and spices. The young leaves of hibiscus can be consumed raw as green vegetables while the seeds are a good source of fiber, fat, protein and total sugars.

Hibiscus tea

1. First collect the hibiscus calyx.
2. Wash them clean. Air or oven dry them at 70 degrees for three days.
3. Take a few of the dried calyx and crash them into small pieces.
2. Put them in a cup and add boiling water-let it steep for 2-4 minutes. Add sugar or few drops of lemon juice as desired.

Hibiscus Wine

1. Sort the calyx to remove chaff and those of poor quality.
2. Boil the dry calyx in water to obtain the juice and extract.
3. As the leaves boil to get the juice extract, sugar mixed with water is boiled separately to form a liquid.
4. Mix the juice extract with the sugar and water mixture. Stir this well and add yeast to help in fermentation.
5. Put the mixture in fermentation/maturation tanks and let it stay for at least 6 months when it's ready for use.
6. When matured, put it into bottles for later use or sale.

Note: From practicing producers, 10kg of quality dried hibiscus calyx can produce at least 500l of wine. To make dry wine, you can choose not to add the sugar.



EARN FROM THE FARM

Production and export of French beans in Kenya

Although the crop has low consumption among local markets, it is one of the dominating crops in the export markets, with the main markets being the U.K, France, Germany, Holland and Belgium

By **Carolyne Anaye**

FRENCH BEANS (PHASEOLUS VULGARIS) belong to the Fabaceae family and are cultivated for their immature pods and seeds. Other common names include mishiri, green beans or snap beans. Although the crop has a low consumption among the elite local urban markets, it is one of the dominating crops in the export market with the main markets being the U.K, France, Germany, Holland and Belgium.

In Kenya, French beans are grown mostly by both large scale and smallholder farmers in the warm-wet regions of Nakuru, some parts of Kajiado, Thika, Murang'a, Machakos, Uasin Gishu, Western Kenya, Kisumu, Kirinyaga, Nyeri and Naivasha. With irrigation, French beans can be grown throughout the year.

Health benefits and nutritional value of French beans

They contain sodium, saturated fats and cholesterol making them the best natural aid for weight loss. Other health beneficial vitamins and minerals include; phosphorous, calcium, copper, potassium, magnesium, protein, fat, starch vitamins A, B, D, K, omega 3, fatty acids and dietary fibre which are essential to the body.

Ecological requirements

Soil- the crop thrives in well drained soils which are rich in organic matter and with a slightly acidic to alkaline PH of 6.5-7.5.

Temperature- the optimum temperature ranges from 20-25°C but it can survive ranges of 14-32°C depending on the variety. Extremely high temperatures result to poor flower development and pod set.

Altitude- 1000 – 2100M above sea level is suitable for the crop. However, French beans mature faster in warmer areas.

Rainfall- for rain fed farming, well distributed annual rainfall of between 900-1200mm is suitable. Too much rain or long dry spells are not favorable as they eventually lower the yields. Excessive rainfall during flowering causes flower abortion and increased disease incidences.

Cultural practises

Land preparation should be done early enough preferably before the onset of rains and also to allow for weeds to dry and decompose before planting. French beans are normally propagated by seed. There are several varieties of French bean which have different colors, ranging from green to yellow and purple.

The commonly grown varieties in Kenya for export are Alexander, Amy, Emelia, Julia, Paulista, Olivia, Samantha, Tanya and Xera among others. Details of some varieties include:



The crop thrives in well drained soils which are rich in organic matter and with a slightly acidic to alkaline PH of 6.5-7.5.

- **Amy- Maturity Period:** 58 –60 days grown for extra fine & fine grades resistance to anthracnose and common bean mosaic virus.
- **Paulista-Maturity Period:** 58 –60 days, grown for Bobby grade for export mainly to UK resistance to anthracnose, common blight and common bean mosaic virus.
- **Samantha:** grown for extra fine & fine grades, Maturity Period: 58 –60 days resistance to anthracnose and common bean mosaic virus.

Spacing of French beans depends on the variety, water availability and soil fertility, among other factors. However, for single rows, a spacing of 30x15cm (one seed per hole) or double rows of 60x30cm is recommended. For easy management of the crop, it is advisable to plant in blocks of four single rows which are separated by a 50cm path. Hard soils with little organic matter will not give good yields of French beans, unless organic matter is provided, preferably in the form of good quality compost or well decomposed farmyard manure applied in planting furrow and worked into the soil at the rate of 10 tonnes/ha.

Water management

A regular water supply is essential for French beans as moisture affects yields, uniformity and quality and therefore watering is essential in cases where rainfall is inadequate. Water stress during flowering and pod formation reduces yields, causes flower abortion and curved pods. It is also advisable to grow the crop on hills or ridges because they are very sensitive to water logging and root rot could be a problem.

Weeding

Weeds infestation significantly lowers the production potential of the crop as they compete for growth factors and harbour diseases and pests, therefore, proper weed management is very important.

Crop rotation

This should be done with crops that do not belong to the Fabaceae family as it helps in weed control, pests and disease management, reduction of soil erosion, and rejuvenation of soil organic matter.

Pests and Diseases Management

Common pests that attack French beans include whiteflies, red spider mites, bean fly and flower thrips. To control these pests, practice crop rotation, use plant-resistant varieties, mixed cropping and the use of neem products. Common diseases include powdery mildew, bean rust and angular leaf spot. To eradicate these diseases, use plant-resistant varieties, neem products, or practice crop rotation.

Pest and disease prevention with EM or BM

EM (Effective Microorganisms) and BM (Beneficial Microorganisms) have been shown to prevent many diseases and a few pests in various crops when sprayed on a regular basis. These are commercial products and are readily available in Kenya. It is organically acceptable and quite cheap.

Whiteflies

Bean rust
Red spider mites
Angular leaf spot

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Tune to Radio Maisha every **Thursday at 7.30 PM** through any of these Frequencies to receive Kilimo Hai, TOF Radio Swahili farmer programs. TOF Radio and Radio Maisha partner to bring you these educational programs.

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

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

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

Tuko Mbele Pamoja!

CONTINUED FROM PAGE 11

Production and export of French beans in Kenya

Harvesting

French beans are harvested before the pods are fully-grown. Harvest starts 7-8 weeks after sowing in early cultivars. Pods should be picked every 2-3 days. It also depends on the market specifications, for instance, twice a week for the fine French beans and three times a week for the extra fine beans, and can continue for around a month.

Post-harvest Handling

The harvested beans should not be left in direct sun, but kept in cold store or shade and the harvest boxes should not be overfilled.

Sorting and Grading

Sorting is done in order to get rid of broken, twisted and perforated pods as well as plant debris while grading should be done according to size of the produce and the customer specifications.

French Beans grades

- Extra fine pods: Are very tender, turgid, seedless, with no strings, and free from any defects. The width of the pods should be less than 6mm and the minimum length of 10cm.
- Fine pods may have small seeds and be short with soft strings, be turgid and tender. The width of the pods should be between 6-9 mm while the length of 12-14 cm is recommended.
- Bobby beans comprise those which do not qualify for inclusion in the higher classes but satisfy the minimum requirements specified above. Beans should be reasonably tender and seeds should not be too large

Packing

Operations involved in packing result in boxes of produce that must be in conformity with the quality standard for French beans and each box packed for the export market must display the product characteristics, i.e., name of producer/exporter, size, category, origin, etc.



Storage

Soon after packing, the produce should be kept in a cold room at 4°C, and a relative humidity of about 80%, French beans can store for a week but for export can only store for two days.

Market

The export market in Kenya falls into two major seasons, i.e. high demand season (September to March, where major supply is mainly from irrigation) and low demand season (June to September, during the long rains when supply is too high, thus lower prices. Supermarkets in Europe reject Kenyan-grown French beans that are not straight enough or are too long. The result is food waste and worse farmers lose out on income. Nevertheless growing beans for export is still good business for small scale farmers in Kenya, even though they are constrained by the demands imposed by the companies contracting them.

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