

Dear Reader,

Every New Year brings with it new aspirations. At TOF Magazine, we believe that you have new ideas to grow your farming ventures and take up challenges that were hard to overcome last year. This edition gives you a unique idea of growing butternuts not just for consumption at home, but as a business venture. For mango growers who incurred losses in the peak season late last year from fruit fly infestation, this edition offers affordable and safe approaches to manage fruit flies and evade losses come the next season.

The rains have been intermittent and as we know, certain poultry diseases thrive in wet seasons. Read on for information on how to prevent and manage coccidiosis in chickens.

As you get ready for the planting season, ensure to do things purposively. Do not fall into the trap of doing things out of routine, plan to grow food in a sustainable way, without degrading your soil with synthetic chemicals; instead, choose to enrich your soil for the long-term using organic matter. In November edition we guided you on using various types of green manure. In this edition, you will learn how to make plant tea from various plants as well as making vermicompost and how to apply them on soil and plants for optimal growth.

Finally, how much is your farmer group doing to grow? Be inspired by Kwa Ngindu Farmers Group in Makueni which is on its way to becoming a micro-lender thanks to the ambition and diligence of its members.

Grow with every edition of your favourite organic farming magazine this year!



## Harnessing Wealth and Health from Butternut Farming

by Vincent Kipyegon

The health benefits of butternut

Butternut is a delicious and highly nutritious fleshy fruit from the squash family. Its short maturity period and high yield makes it a viable cash crop for both small and large-scale farming. Butternut can be boiled, roasted, and served as a snack substitute to bread, mashed with potatoes, and served with rice or even pounded to make vegetable soup.

A butternut plant consists of four parts; feeder root, feeder leaf, the vine which can grow up to 10 meters, and the reproductive parts which flower out to develop the butternut fruit. The butternut fruit is a yellow, elongated and pear-shaped fruit that is distinct from other cucurbits species. Butternut can be intercropped along with legumes and cereals as well planted with trees as it is a climber plant.

1. The presence of vitamin A is good for the immune system. Vitamin A content also boosts healthy eyesight.
2. Consuming butternut regulates high blood pressure through potassium content.
3. Butternut improves sperm quality due to the presence of zinc content.
4. Butternuts are a good source of fiber content which aids in weight-loss management. The high fiber diet helps to prevent constipation and promotes a healthy digestive tract.
5. Butternut contains powerful antioxidants such as carotenoids that guard against stomach, prostate, lung, breast, colon, and pancreatic cancers.



## Varieties of butternuts

There are various varieties of butternut; Atlas F1, Pluto F1, Waltrum, and Jupiter hybrid seeds which are available at agro-vets or certified nurseries. Jupiter is the widely grown variety in Kenya due to its nice yield and nice flavor. Propagation of butternut is done by direct sowing in the field.

## Ecological conditions for growing butternut

Butternut grows well in temperatures between 18-30 degrees Celsius, annual rainfall between 700mm to 1000mm, and moderate sunshine throughout the planting period. The soil should be deep, fertile, and well-drained loam soil with a neutral pH. The planting seasons are April to June, and August to December.

### NB:

A beehive is recommended to be situated within a 3 km radius of the farm preferably 1 beehive per acre for effective pollination. Butternut is a monoecious plant (has both male and female parts on the same plant) thus proper cross-pollination requires a heavy presence of wild bees for optimum yields. Low pollination may lead to poor yields and improper shape of the butternut fruit.



## Land Preparation

Land preparation starts by ploughing and re-ploughing the land within 7-10 days. Harrow the land to ensure the land is level, hardpan is broken and the soil has a smoothing tilt. Broadcast compost manure and slurry evenly on the land. This will aid the spreading of butternut vines and feeder roots will absorb nutrients as it grows.

## Planting

The holes are dug between 0.6 to 1 feet, 1m by 1m; compost manure or slurry from biogas is mixed with soil at 1 liter of slurry or 1kg of manure per hole with the soil a day before the actual planting. This will allow the heat generated by decomposing slurry to escape.

The seeds are then shallowly planted 1 seed per hole. Germination takes place after 7 days. The butternut develops a feeder leaf, feeder root, and a vine. One butternut seed can develop 4 to 5 vines. The plants should be watered every evening in cases where rain is scarce.

## The Flower

The butternut flower develops after 60 days. Topdressing and weeding are reduced gradually. Cross-pollination takes place. In some instances, female parts may sprout earlier than male parts, for effective pollination, it is often advisable to plant one line of butternut a week earlier or there be a presence of an existing butternut plantation within to facilitate the transfer of pollen grain during the flowering stage.

## The Fruit

Mature butternut turns yellow after 90-100 days. Mature vine turns from green to brown while leaves might turn yellow. Harvesting is carefully done by plucking the fruit along with part of its vine (5-10 cm) that will aid in curing and longer storage.

## Weeding and leveling

Weeding is carried out every 14 days up to 60 days. Weeding is done using a hand hoe. Shallow weeding is done by removing weeds using hands to avoid uprooting the plant feeder root. The land should be leveled to allow the plant to spread freely across the surface. Compost manure is applied throughout the growth period to nourish the vines as it spreads on the soil surface.

## Fertilizers

Bio-fertilizers can be applied throughout plant growth stages. Tecamin by Agritecno is a liquid organic fertilizer with a variety of purposes; rooting, healing, leaf development, flowering, and fruiting. Butternuts can be top-dressed with Tecamin during its growth lifecycle to facilitate continuous supply of nutrients.

## Pest and disease management Storage and Curing

Pests and diseases that affect butternut include cutworms, squash bugs, aphids, squash vine borer, powdery mildew, and anthracnose. Bio-pesticides should be sprayed onto the butternut 7 days after germination to curb cutworms which destroy the roots. On fruition, butternut fruits that may develop black rot due to fungal infection are removed and isolated. The plant is then continuously top-dressed using calcium-based bio-fertilizers.

Powdery mildew may attack the leaves during the cold season. Plant-based extracts; neem and garlic extracts can be applied to control powdery mildew. Foliar feed is also applied to aid the growth of vines, feeder leaves as well as control pests and diseases.

## Harvesting

A ripe butternut fruit turns from green to yellow. One butternut plant can produce between 3 and 5 fruits. Harvesting can be carried out daily for up to 2 weeks. It is done by plucking the butternut fruit and a few centimeters of the vine that aid in curing. The fruit is stored in a bucket in an inverted position to prevent them from crushing each other. Clean the fruit by rinsing with water. The fruits are then weighed and graded according to sizes: large, medium, and small.

Butternut can be stored in cool dry places for up to 6 months. However, one month is the recommended period for storage before being transported to the market to allow for proper ripening and curing.

## Marketing

The prices of butternut fluctuate depending on locations. 1kg goes for Ksh40 - Ksh70. While pumpkins can be sliced and sold in pieces, butternuts are often sold whole.

## Conclusion

Food security in Kenya relies on long-term crops such as butternut and pumpkins. There is an emerging market for butternut. 1000 seeds of butternut grown on a 0.25-acre land can yield 2500 fruits of butternut.

With a minimum input of Ksh30,000 (seeds, labor, and inputs), a farmer can reap an income of Ksh70,000 in under 4 months. Butternut farming is a venture that requires minimum input with greater returns within a short period.

<https://infonet-biovision.org/PlantHealth/Crops/Pumpkin>

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## Plant Tea Fertilizer

### By Mourice Barasa

Plant tea fertilizer refers to the liquid extracted from plants and weeds through a fermentation process to add organic nutrients to plants in folio. Plant tea organic fertilizer provides the crops with essential nutrients contained in specific plants or weeds.

The leaves are crushed and soaked in water for a while to release all vital nutrients into the water. Additionally, tea fertilizers can be obtained from manure or compost fertilizers.

### Commonly used Plants and Weeds:

Horsetail (*Equisetum hyemale*)

Horsetail is a weed characterized by deep roots that reach vital minerals such as silica, potassium, and iron. It is also known as the scouring rush. It is an evergreen plant and is classified under non-flowering plants. Most food and cash crops are shallow-rooted crops hence lack mineral nutrients found deeper in the soil.

Therefore, plant tea extract from *Equisetum hyemale* helps to provide concentrated silica, potassium and iron to crops.



### Alfalfa (*Medicago sativa*)

Alfalfa is commonly grown for livestock feed. It is a perennial flowering plant classified under leguminous crops in the family Fabaceae. Apart from being used as hay, silage, or grazing, large-scale farmers globally use Alfalfa to prepare green manure. It is rich in vitamin A, nitrogen, calcium, trace minerals, potassium, and folic acid.

The liquid extracts, therefore, play a key role in soil fertility enhancement and pH regulation. Nonetheless, the residues can be used for mulching.

### Willow (*Salix babylonica*)

There are different types of willow either growing naturally or through cultivation. They occur as either deciduous shrubs or trees. They are dominant in moist soils under cold and temperate climatic conditions.

They have a high concentration of growth hormones, which is crucial for regeneration and faster growth of the seedlings. The willow tea fertilizer is commonly applied to new transplants to fasten their growth rate.

### Comfrey (*Symphytum Officinale*)

Comfrey is a perennial flowering weed found in the family Boraginaceae. The weed absorbs essential nutrients such as calcium, potassium, phosphorus, magnesium and trace minerals. It is also rich in vitamins A, B, and C. Extracts from comfrey provide the crops with essential nutrients necessary for quantitative and quality growth.

### Chicory and Dandelions

Chicory is considered among plant tea fertilizers because of its high concentration of calcium, potassium, and vitamin A. Dandelions on the other hand has high level of vitamin A and C, potassium and calcium making it an important ingredient for making plant tea fertilizers.

### Plant Tea Fertilizer Preparation Steps:

1. Plant the targeted plants or weeds and allow them to mature.
2. Chop the weeds/plants (especially leaves and young stems) into small pieces that can be compressed to release the sap from the plants.
3. Fill the container with water to about half full (ensure that the water used is not chlorinated. If possible, use rainwater).

4. Add the chopped plants into the container to make it full and stir the mixture.
5. Cover/screen the top of the container with transparent material to reduce the entry of micro-organisms such as mosquitoes into the tea.
6. Keep stirring the mixture for about two weeks to enhance the successful aeration process for complete decomposition.



7. After two weeks, sieve the liquid off the mixture. The liquid will be used as foliar spray fertilizers. The residues can be returned into the compost pit to decompose and be used as manure.
8. Using a spray gun, spray the fertilizer on the leaves of the crops before it rains. The leaves' rate of nutrient absorption is higher than that of the roots; hence plant tea fertilizer is advised to be applied as a foliar feed. The tea can be applied directly or diluted depending on its concentration.

#### Advantages:

##### Easy to prepare-

Unlike other organic fertilizers, plant tea fertilizer is easy to prepare and takes the shortest time to be ready compared to other manure.

##### Affordability-

Since plant tea fertilizer can be prepared by any person using either weeds or readily available plants, the price is relatively low and affordable.

##### Fertility-

Plant tea fertilizers contain rich mineral fertilizers that are vital for the growth and development of crops, environmentally friendly and sustainable.

#### Factors to consider when applying tea fertilizer

- a.) Precipitation- spraying the fertilizer should be done when the leaves are dry to avoid being washed off. Sunny mornings are favourable for foliar feed spray.
- b.) Wind- spraying should be done in the morning when the wind is calm to ensure even fertilizer distribution on the leaves.
- c.) Nutrients concentration- proper analysis of the required nutrients and their levels in the soil should be done before application.

#### Sources

<https://www.almanac.com/fertilizer-tea-plants-weeds-and-grass#>



## Tips of healthy diets preparation at the family level

By Mary Mutisya

Non-communicable diseases account for 39 percent of deaths in Kenya annually. Some of these are lifestyle diseases that can be alleviated by healthy eating habits. Adopting healthy eating habits requires one to learn how to plan and prepare food that consists of a balanced diet.

Although diets and eating habits of people are highly influenced by various factors such as location, type and amount of food available, individual needs, beliefs, income, time, and nutrition information, there are common tips that one can use in choosing the foods to eat to ensure the body gets all its dietary needs and therefore keep off some of the diseases arising from poor feeding habits.

To meet this, experts advise that a healthy plate should therefore contain:

- **Plenty of organic leafy vegetables-** The recommended serving for fruits and vegetables are five servings in a day. It is advisable to eat at least half a cup of cooked vegetables or 1 cup of raw vegetables in each meal. This is achievable by taking advantage of the fresh fruits and vegetables that are in season as they are cheaper and readily available. Using a little oil when preparing vegetables helps in absorption of nutrients by the body as vitamins found in vegetables, especially vitamins A,D, E and K which are fat-soluble.

- **Have legumes as often as possible-** The recommended consumption of legumes is at least four times a week. Legumes are rich in dietary fiber and many other vitamins, and therefore assist in digestion and general health.

Examples of legumes are:beans, pigeon peas, lentils, soy beans among others.

- **Contain more of white and sea meats in place of red meats-** These should be consumed at least twice a week.

- **Incorporate fresh and fermented milk as often as possible-**

- **Use fats and oils in moderation-** There is a need to emphasize healthier cooking methods such as boiling, steaming, and baking rather than frying. Excess oils should be strained from cooked food before serving and processed foods containing trans-fatty acids should be avoided. Trans fat is formed through an industrial process that adds hydrogen to vegetable oil, which causes the oil to become solid at room temperature. Food manufacturers may add or use trans fats when processing foods, since hydrogenated oil does not spoil easily. Health experts however warn against consumption of such foods as they increase bad cholesterol in the body while reducing good cholesterol and this exposes consumers to heart and blood vessel diseases. Some of the common foods with trans fats in the market today include: baked goods such as cakes and cookies, frozen pizza, deep fried potato chips, fried chicken sold at fast food joints in most markets and towns, and stick margarines. It is unhealthy to consume these foods regularly.

- **Use salt and sugar very sparingly-** consumption of sweetened foods and carbonated drinks should be discouraged as well as excessive use of salt. Iodized salt should however be used in regulation to help prevent goiter.

- **Consume enough water-** Studies recommend that Men should take about 15.5 cups (3.7 liters) of fluids a day while women should take about 11.5 cups (2.7 liters) of fluids a day to stay healthy.

#### Meal planning at the family level to help achieve healthy food eating

At the family level, meal planning should be the whole family affair; it should be done ahead of meal preparations to save on time and money. Some of the key considerations during meal preparations should be seasonality, cost of food, family size, nutrient requirements for family members, fuel cost/access, and religious beliefs/taboo. The following should however be followed for optimum healthy eating within the family.

- a.) *Nutrient absorption enhancers such as oil should be added to meals sparingly as they aid in absorption.*
- b.) *Fermentation and germination for cereals and legumes before cooking is recommended to reduce inhibitors such as tannins, phytates, and oxalates in some, cereals, legumes, and vegetables which are known to reduce iron absorption.*
- c.) *Boiling water should be added to foods rather than cold water where applicable, e.g. when cooking vegetables.*
- d.) *Vegetables and fruits should be chopped just before cooking or eating. Vegetables and fruits should be eaten as fresh as possible.*
- e.) *Minimal water should be used when cooking vegetables and draining water from the food after cooking should be discouraged.*
- f.) *Bicarbonate of soda should not be used in vegetables since it destroys vitamins B and C.*
- g.) *Oxalates are known to inhibit calcium absorption in the body, therefore, chopping up vegetables high in oxalates such as spinach before cooking is recommended.*

[https://infonet-biovision.org/healthy\\_food](https://infonet-biovision.org/healthy_food)

## Coccidiosis is a major poultry disease

By Susan Wanjiru

When Mary noticed bloody stool from her one-month-old chicks, she wondered what the cause could be. She consulted her agroveter, who visited and confirmed that the chicks had Coccidiosis.

Unfortunately, by the time she managed to control the disease, 10 out of her 50 birds had died.

Coccidiosis is a disease that continues to cause huge losses for poultry farmers not only in Kenya but also worldwide. The disease affects not only chickens but also turkeys, geese, and ducks.

An outbreak of Coccidiosis often results in a very high negative and economic impact on the flock.

In mature chickens, it causes an immediate and considerable drop in production. The recovery and reestablishment after treatment is usually slow.

#### What causes Coccidiosis?

It is caused by a protozoan parasite known as Eimeria that invades the cells of the poultry intestine. Protozoa are infectious single-celled microorganisms. They differ from bacteria, viruses, and fungi that are considered classic infectious agents. Several species of Eimeria can affect chicken. The severity of disease, clinical presentation, and mortality depends on the particular species responsible for the infection. Different species affect different parts of the digestive system of the birds. However, they majorly affect the small intestines and the ceca (a pouch that connects to the junction of the small and large intestines).

#### How does it spread?

Coccidiosis often spreads through infected feces when they are exposed to poultry food or water. They can also remain in unchanged bedding. The parasite thrives in damp and dirty environments. In the right conditions, it can survive outside the chicken's body for four years.

#### What are the clinical signs of Coccidiosis?

Affected animals may exhibit some or all of the following symptoms:

- Decreased growth rate characterized by a high percentage of visibly sick birds;
- Severe diarrhea (mostly bloody) with mucous and high death rate;



- Reduced feed and water consumption;
- Weight loss, decreased egg production, droopiness, ruffled feathers that may droop;
- Mild infections of intestinal species (subclinical) leading to secondary bacterial infection which causes other diseases;
- Survivors of severe infection, recover in 10–14 days, but they may never recover their lost performance;
- Sick and recovered animals continue to shed the parasites in their droppings and serve as a source of infection to others.

## Diagnosis, treatment, and control

Your animal health practitioner can make a diagnosis from the clinical signs or lesions on the bird's intestines, upon performing a post-mortem examination. He can take samples to the laboratory for confirmatory diagnosis. The professional can then advise you on the best actions to take depending on the severity of the disease.

Because prevention is better than cure, farmers should focus their efforts on reducing the presence of parasites in the flock in the following ways:

- i.) *Maintaining hygiene in the chicken coop and its surroundings. Damp environments should be avoided as they are good breeding sites for parasites. Always keep your chicken house clean and dry. Regularly sweep and change the bedding (sawdust or wood shavings, etc). Build your chicken coop with enough openings to ensure adequate sunlight.*
- ii.) *Change drinking water every day and make sure it is fresh and clean. Where possible, raise your drinkers so that dirt and feces from the bedding do not go into their drinking water. Also, place them strategically to ensure minimal wetness in case of water spills;*
- iii.) *Do not mix adult chickens and chicks as the adults can introduce diseases to the young vulnerable ones;*
- iv.) *Avoid mixing new chicken with your existing brood immediately after they arrive. Quarantine new ones for a week or two and let them join the others when you are sure that they are healthy;*
- v.) *Practice an all-in all-out production cycle where birds get to a house and leave at the same time. Clean and disinfect the chicken house at least seven days before bringing in the new brood;*
- vi.) *Avoid buying anticoccidial drugs over the counter when you suspect that your chickens have Coccidiosis. Self-treatment can result in the development of resistance or the presence of drug residues in meat and eggs.*

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

## Farmer Group thrives from drought to abundance

By Purity Khandasi

Kwa Ngindu Farmers' self-help group is a group of 25 vibrant women from Watema, a sub-location in Makueni County who initially came together in search of water during a drought in 2008, a persistent issue in most parts of eastern Kenya. They never thought that thirteen years later they would be holding a trophy as a result of their efforts and dedication.



### The beginning

"We came together in search of water for our domestic animals and crops and that was when we formed the self-help group," narrates Ruth Makau, the chairperson, and from the smiles on the members' faces, one can tell that they got to achieve more than what they anticipated.

Through the help of Kaiti CDF funds, they constructed an earth dam in one of the member's farms. Driven by their ambition to conceive more projects, they started a merry-go-round where each member would contribute 20 shillings on a weekly basis. They later increased their weekly contribution to 200 shillings and presently they are contributing 500 shillings which is set aside for table banking.

### Table banking

Table banking is a group-based funding strategy in which members form groups where they can save and borrow money immediately during meetings. The objective is to help the poor, particularly women, fight poverty.

They have a monthly contribution of 500 shillings that goes to table banking and in turn, every member of the group can afford to get a loan from the group that goes at an affordable interest rate of 5 percent.

Through their savings, they can apply for loans of up to 50,000 shillings from the Uwezo Fund, an initiative launched by the government to enable groups to achieve their financial goals. Despite these strides, their current target is to save more so as to allow the members to borrow from the group.

### Achievements

In September 2021, the department of adult education in the county government of Makueni awarded Kwa Ngindu SHG a trophy for not just their dedication, best table banking practices, but also for being the best farmer's group that has adopted agroecology farming practices with a lot to show for it.

"Through the guidance of Mbithi, all our members practice agroecology, and we have learned a lot of organic farming practices like composting and use of organic fertilizers and the use of plant extracts to manage pests on our crops especially through The Organic Farmer magazines which we receive every month," says Lucy Nduku, the group secretary.

Joseph Mbithi, BvAT's extension officer in the county has been imparting the smallholder farmers in the group with knowledge on agroecology and guiding them in applying it on their farms.

When Nyota beans, a variety of beans suitable for dry lands developed by KALRO Katumani was featured in TOF Magazine, the group embraced the idea, and joined forces to purchase the seeds and multiply them for each member to get enough seeds for propagation in their individual farms. "We planted 3kgs of the Nyota bean variety on 1/8th of an acre and harvested 60kgs, which we divided amongst ourselves as seeds" says Beatrice Ndambuki one of the members.

Further, the group through donations from Heifer International has grown economically by acquiring gala goats and chickens.

Beatrice who is the best performing group member, already has ten gala goats and over 20 chickens of different breeds.

Every other member has chickens and goats which continue to multiply, providing them with sources of income and food for their families.

The group's advice to other smallholder farmers was quite simple; 'Umoja ni nguvu' a Swahili saying meaning unity is strength. For a smallholder farmer, one gets to achieve more if they are part of a farmer's group.

## Fruit Fly Management Tips for Mango Farmers

By Grace Kinyanjui



Fruit flies are insect pests that attack a wide variety of fruits and vegetables. Examples include mangoes, avocados, pawpaws, bananas, citrus fruits, watermelon, pumpkin, courgette among others. Adult females lay eggs inside the fruits and the developing larvae feed on the fruit flesh. Usually, the infested fruits and vegetables rot making them unsuitable for human consumption and unmarketable. Fruit flies are also ranked as quarantine pests and thus restrict access to the international market for the infested crops.

Most farmers often use synthetic insecticides to control fruit flies, which are not always effective and are hazardous to human health and the environment. Indeed, blanket application of pesticides on fruit trees is expensive and increases production costs.

Sustainable production of fruits and vegetables in Kenya calls for the adoption of integrated pest management (IPM) strategies to effectively control fruit flies. For instance, a fruit fly IPM package developed by icipe has yielded health, environmental and economic benefits among mango farmers and consumers.

The package emphasizes the combined use of pest control components such as population monitoring, male annihilation technique, spot application of protein bait, field sanitation, application of *Metarhizium anisopliae*-based biopesticides, and use of parasitoids. This IPM package has been effective on mango production but can also be applied to other host crops that are targeted by fruit flies.

**Monitoring.** Traps loaded with a male attractant or protein bait, combined with an insecticide are used to monitor the population levels of fruit flies. The females are attracted to protein bait such as Mazoferm, while the males are attracted to male lures such as methyl eugenol and are killed by the insecticide. These traps are available at Kenya Biologics Ltd, Koppert Biological Systems, and several agrovet. They can also be made at home using plastic cooking fat containers or water bottles. The traps are hung with respect to the height of the target crop and are checked regularly. A high number of trapped fruit flies trigger the application of suitable control methods.

**Male annihilation technique.** This involves mass trapping of male fruit flies using male lures in combination with an insecticide. Several traps are set up on the farm to increase the trapping activity. Mass trapping creates a shortage of males, reduces reproduction rates, and suppresses the population levels of fruit flies.

**Spot application of protein bait.** Female fruit flies require protein to develop mature eggs. Protein bait, Mazoferm is therefore mixed with an insecticide and applied on localized spots to attract and kill fruit flies. Mazoferm is commercially available in Kenya.



**Field sanitation.** This is a cultural practice of maintaining hygiene on the farm. All infested fruits on trees and ground are collected and destroyed or buried. Farmers can make augmentorium for keeping all the infested fruits. This tent-like screen structure helps in augmenting and conserving the natural enemies, and the retained fruits can serve as compost. Other recommended cultural practices include weed control, selective pruning, fruit bagging, and early harvesting of mature fruits and vegetables.

**Biological control.** Biological control of fruit flies involves the use of biological control agents and biopesticides. Biological control agents are the natural enemies that attack fruit flies. They include parasitic wasps, predators, and pathogens, and are naturally available in our farms. Also, two foreign parasitic wasps are mass-reared at International Centre of Insects Physiology and Ecology and released in various mango farms in Kenya for effective control of fruit flies. Farmers are encouraged to adopt practices that conserve these natural enemies, such as zero application of synthetic chemicals, use of augmentorium for field sanitation, and maintaining flowering plants in their farms as food sources and refuge habitats.

The most common biopesticide used for the control of fruit flies in Kenya is Campaign®. It is based on an insect pathogenic fungus *Metarhizium anisopliae* and was developed by icipe and Real IPM Ltd. Campaign is commercially available and can be used as a soil drench to kill the larval and pupal stages of fruit flies in the soil or applied to traps baited with protein bait or male lures to kill the adult stages. These IPM practices apply to all farmers and serve as an important initiative to promote sustainable agriculture in Kenya.  
<https://infonet-biovision.org/PlantHealth/Pests/Fruit-flies>



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| Kericho  | 90.5      |
| Eldoret  | 91.1      |

Tuko Mbele Pamoja!

## Why you should try vermicomposting this year

By Esther Mwoloi

By now you must have heard of vermicompost. The story of Raphael Mbuvi will inspire you to try out rearing the red wiggler worms to obtain proteins for your chickens and fish, organic fertilizer for your soil and foliar for your crops.

Since 2016 when Raphael Mutie Mbuvi a farmer from Kathekakai in Machakos County discovered vermicompost, during a farm field exchange with other farmers in Laikipia, he has never turned back. He says the technology has helped him cut costs in the farm and his crops are now more productive.

Initially, he purchased 1kilogram of the red wiggler worms which he mixed with ready compost and some water then mixed evenly to ensure the mixture does not become soggy nor dry. If the mixture is soggy, Mbuvi says there will be poor aeration and if too dry the worms' skin is too delicate to persevere roughness of the compost. You can alternatively cover the top with some mulch to minimize on evaporation and to protect the worms from birds such as chicken and hawks.

"It is always good to keep on checking whether the compost has enough water or whether it's starting to dry at the top since it should be moist always and if you encounter some dryness at the top add some water but avoid mixing it with a stick or any other object as this can injure the worms," says Mbuvi.

From one kilogram, Mbuvi harvested 5 kilograms of worms in just four months. He sells a kilogram at Ksh1000 to other farmers and uses the rest to feed his chicken. "I feed the red wigglers to my chicken twice a month, as too much protein is also not good for chicken.

Apart from feeding the worms to chicken, one can also use the fully decomposed compost to make foliar feed which is a source of nutrients for plants.



### How to make foliar feed from vermicompost

After harvesting the worms;-

- Take the fully decomposed substance which the worms have bred and soak in water.
- Sieve to remove any particles; the liquid you obtain is vermicompost

Once your vermicompost is ready, mix a liter of it with 20litres of water to obtain the foliar feed

- Mix the foliar feed with some little amount of cooking oil which aids in sticking of the foliar feed on the leaves of the plants or fruits.

Since the foliar spray is an organic fertilizer which is applied directly to plants a farmer can use it at any given time.

Note: Avoid spraying to fully grown fruits since it may cause them to burst due to excessive amounts of nutrients.

The foliar feed adds more nutrients to the plants and makes the plant leaves look healthier and appealing. So far Raphael has been able to train farmers from his neighborhood on rearing of these worms, uses the worms to feed his chicken and making of foliar feeds for his crops. The dry matter, he applies to the soil as a fertilizer.

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### FARMER'S FORUM

Roselyne Alkahi from Busia is selling cassava.

Joseph Chungu from Laikipia is selling Meru Oak seedlings

Purity Wanjiru from Kerugoya is looking to purchase geese

Abinaya Masutu from Ikolomani wants to buy improved kienyeji chicken

To reach them call us on 0715422460



#### Partner organizations



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

#### TOF on the web:

<https://biovisionafrica.org>  
[mkulimambunifu.org](https://mkulimambunifu.org) | [infonet-biovision.org](https://infonet-biovision.org)  
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