

**Dear Reader,**

Here comes the planting season. Have you already prepared land for planting and spared farm inputs such as manure, seeds and labor? If you have been heaping compost manure, you will not need to spend your hard-earned money in purchasing synthetic fertilizer, which is no match for a well composted farmyard manure when it comes to enriching your soil.

Also, do not be undecided on where to get seeds for planting. If you have preserved seeds to plant, make sure that they are of the best quality and have been stored under appropriate conditions; preferably in airtight containers or packs, stored in a dry, cool place. This ensures that they are free of pests that can infest the seeds when planted. It is not advisable to replant hybrid seeds, as they are meant to be planted only once. After planting the first time, the harvested seeds should not be stored for replanting as the second round will not yield seeds with the desirable characteristics of the first harvest.

When you purchase seeds, ensure that the variety you purchase is suited to the climatic conditions in your region. Seed companies are continually breeding seeds according to various climatic conditions such as rainfall levels, altitude, and temperature. In this edition, we feature seed varieties for maize suitable for various regions which you can buy from Kenya Seed Company outlet near you. Some of these varieties are resistant to diseases affecting maize such as Maize Lethal Necrosis (MLN), and pests such as stem borers and Fall Army Worm. Whenever you buy seeds ensure to confirm the validity of the seeds you buy, by scratching the card on the package, and sending the revealed code to USSD 1393.



## The Potato Cyst Nematode pest in Kenya: a hidden enemy for the potato farmer

By Charei Munene

Potato Cyst Nematodes (PCN) were first reported in Kenya in 2015. Since then, the pest has been reported in much of the potato growing areas in Kenya, with over 80% of sampled farms found to be infested. Potato production in Kenya has been steadily declining, even though the land area under potato has increased. The presence of Potato Cyst Nematodes, could be one of the factors leading to the declining production.

Whereas many diseases affecting potatoes are above the ground and therefore visible to the farmer, PCN is soil-borne and manifests on the roots and tubers, below the ground. Infected plants show symptoms that are mostly confused with symptoms of other diseases such as stunting, yellowing of leaves, reduced vigour and low yields.

### Spread and dissemination

PCN can be easily spread to new farms and between farmer fields when there is transfer of contaminated soil. Contaminated soil can be transferred from one field to another through: seed tubers, equipment, farm machinery or even gumboots. In some cases, PCN can be transferred through contaminated water, which is used for irrigation, or during a heavy storm even through overland water flow; when soil is dry, strong winds

can also transfer PCN in wind-blown soil.

### Life cycle

In Kenya, PCN can have 2 – 3 reproduction cycles per season. Each cycle comes with the release of thousands upon thousands more nematodes on the crop. PCN eggs are enclosed in a pin-head sized, rounded structure, each with hundreds of eggs. This structure, or cyst, is the hardened shell of the now dead female, encasing 400-500 eggs each. Cysts protect the encased eggs, enabling them to survive during periods of hardship and in the absence of a potato host. Once a potato plant is present, chemical signals from growing roots stimulate the eggs to hatch. The wormlike nematodes leave the cyst and locate host roots, which they then burrow into to feed.

Over the period of about 30 days, the nematode transforms through 4 growth stages until it matures into an adult. If checked carefully in the field, cysts appear as milky-white dots on the roots. As the cysts mature they become yellow / brown dots, but which are more difficult to see when mixed in with soil particles. The mature cysts then fall off the drying and decaying roots into the soil, where they can stay for up to 20 years in a dormant but live state, awaiting the next susceptible potato crop.







Figure 1: Roots of potato with PCN cysts, see golden brown dots on roots, Photo Credit: Calvince Orage

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### Symptoms

1. Infested fields have patches of potato that appear weak, wilted and/or stunted.
2. Yellowing of entire plant.
3. Delayed germination/emergence.
4. Extended period to flowering.
5. Reduced root size and number.
6. Lower yields and smaller tuber size.
7. Complete failure of the crop.



Figure 2: A potato field in Nyandarua with yellowing and stunting due to PCN infestation. Photo Credit: Harrison Mburu

### Prevention and management of PCN

Most chemical nematicides, such as Chloropicrin, methyl bromide and others have largely been removed from the market due to their harmful, toxic effects to the environment and are no longer available.

When developing a management plan for PCN it is necessary to consider:

1. Taking a soil test to determine if PCN is present in your field. Make sure you engage a registered laboratory to test for PCN.
2. Plant certified seeds that are clean from PCN. Certified seed will mostly perform better than non-certified seed but may not be resistant to PCN.
3. Practice crop rotation with crops such as maize. When potato is grown in a PCN infested field, nematode densities can increase to extremely high levels resulting

in uneconomical crop yields.

4. Plant trap crops such as African Night shade (Managu) for a season before planting your potato crop.
5. Check that machinery and equipments are thoroughly cleaned and free from plant debris.

### Current Research on PCN in Kenya.

Currently, a number of options for the management and control of PCN are being researched and tested. Scientists at NemAfrica (a joint nematology laboratory between icipe (International Center of Insect Physiology and Ecology) and IITA (International Institute of Tropical Agriculture), together with Kenyan partners are assessing various strategies for the control of PCN. These include the assessment of new, PCN-resistant potato varieties, which are early-maturing and have a short dormancy, key characteristics of the most popular variety (Shangi) currently being grown by farmers, as well as being high-yielding. The scientists are also evaluating the use of trap crops, which may stimulate PCN eggs to hatch, or allow them to infect roots, but do not allow the PCN to reproduce and multiply.

Another area of research is the identification of the chemical signals released by roots to stimulate egg hatch and use these to cause 'suicidal hatch' when using them without a host potato crop being present. Such chemicals, when identified and produced, can potentially be used to disrupt the PCN life cycle. Another, similar area of research is the use of banana fibre paper when planting potato, which appears to block these chemical signals, preventing the PCN from finding potato roots. In addition, much work is being undertaken to better understand the biology of PCN in Kenya, where it is a new pest, having only recently been recorded here.

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

## Machakos farmer discovers gold in his farm

An article on TOF Magazine was Patrick Muli's eye opener to the wealth creation opportunities he had been sitting on.

By Caroline Mwendwa

Patrick Muli, a member of Mutulani Poultry Co-operative Group, knew no better life, than farming for household consumption. He kept a few chickens and goats and grew just enough food to feed his family. This was until he met one Mr. Joseph Mbithi a field officer under BvAT's Outreach Programme. Mr Mbithi introduced him to the idea of farming with an aim to make profits and improve his living standard and that of his family.

Through Mbithi, Patrick discovered TOF Magazine, and his life has never been the same. "I used to be an average farmer and felt limited by lack of capital to make any investment to expand my farming activities into income generating ventures," says Patrick. But this changed when he came across an article in TOF, elaborating on how farmers can make use of available materials to construct poultry houses without having to invest money into the project. "I learnt from The Organic Farmer Magazine about making a chicken house using available material within my homestead. Thereafter, Mr Mbithi, visited our group and trained us on how to do it using poles from tree branches to construct a portable chicken house, spacious enough to accommodate a large number of chickens without crowding," recalls Patrick. While training them, Mbithi, emphasized to them that there is market for chicken if only they are interested in expanding their houses to keep more chicks and venture into a small-scale poultry business.

Patrick took interest in this idea. Through training by Mbithi, he constructed the housing and bought improved Kienyeji chicken with a plan to multiply them for market. Today, Patrick sells over eight chickens in a day. "Chicks aged between one and one and a half months sell at Ksh300 each, a hen at Ksh800 and a cock at Ksh1,200.

Patrick is excited about the changes his small poultry business has enabled in his homestead. "We no longer lack money to cater for our household expenses," he firmly states. His wife ebullient about the ease the small business has created in their home, backs her husband "I remember last year, we needed Ksh10,000 to settle school fees balance for two of our grandchildren, and because of this business, we didn't struggle to raise the money," she says.

Once the mind sights one opportunity, several others become visible. As the couple kept on the journey to learn more from TOF Magazine, with training from Mbithi, they discovered many other ideas, they could employ on their farm to earn money while saving costs. One such idea is use of compost manure in place of synthetic fertilizer. Just outside their kitchen is a well layered compost pit, where they throw organic waste and cover with ash as guided by Mbithi. Free range chicken going about the home fish out worms from the compost for their feed. The couple uses waste from chickens and goats in the farm to make manure. "If only farmers knew how rich in nutrients chicken manure is, they would invest more in them, not only for their meat and eggs, but also for their manure," says Patrick. He further explains that every season, yields from the organic section of their farm are higher than those harvested from the crops grown conventionally.

To keep pests away in their organic farm, Patrick has learnt from TOF Magazine, and through training by Mbithi, how to make the plant extract, from medicinal plants such as the African Marigold and mix with water to spray on the crops. "Applying the extract on the crops regularly repels pests, and the crops blossom" he says. In his farm, Patrick grows maize, beans, mangoes and avocados. When he started selling chickens and eggs, Patrick also discovered other business opportunities from produce in his farm. An avocado tree that had fruited to fullness, and whose value he did not know, was left for the dogs, as they devoured the avocado fruits falling off the tree. "We used to invite dogs to clear the fallen fruits so that we could attend to the land under it," recalls his wife. Then one day, a buyer in search of avocados approached them, and that is when they discovered a gold mine in the avocado tree that they once thought was a hindrance. "The lady requested that we sell to her all



the fruits on that tree, and in one sale, we earned Kes9,400 from 15 bags of avocados," explains Patrick's wife in awe.

That incident opened their eyes to the income opportunities that they have been oblivious to within their farm. Patrick decided to plant more avocado trees and graft them for better quality fruits. "I already have the seedlings awaiting grafting," he says,



stating his plan to tend to the trees, and accord them all the necessary attention, as he now knows their value.

With the income flowing, Mr. and Mrs. Muli are filled with gratitude for coming to know Joseph Mbithi, and the wealth of information they have been learning from the TOF Magazine. They plan to expand their poultry business, to meet the increasing demand as they seek other opportunities to diversify their source of income in farming.

### Improved livelihoods

Mr Mbithi is a household name among farmers in Machakos owing to the development ideas he has injected in many farmer groups, whose members' lives have improved. "When I first vis-

ited Mutulani Poultry Co-operative Group, to which Mr Patrick is affiliated, they were investing in merry-go-round but hadn't put in place a development plan. I approached them, first with the idea to buy 3,000 litre tanks, to store water for their families that would last from one rain season to the next.

With support from the County government of Machakos, all the members were able to acquire tanks at a discounted price of Ksh17,000, down from the retailer price of Ksh21,000. Having ticked the clean water box, the group then set targets to ensure that every member had solar system installed in their homes. Today out of a total of forty members, 28 have installed solar systems and some of the members have electricity installed. Mbithi also encouraged them to purchase energy saving jikos or have improved jikos constructed in their kitchen. Today, 24 members have the modern jikos in place of the old fashioned three cooking stones in their homes.

"My plan now is to ensure that every member in the group, is at least making Ksh4,000 weekly from sales of farm produce," says Mbithi. Most farmers in the group, have been linked to markets for their produce through Mbithi's efforts to create partnerships with farm produce buyers including institutions and other retailers. Others through constant training on marketing, have cut a niche in supplying farm produce from farmers to large scale buyers. In the next edition we tell you the inspiring story of Mwendu from her small beginnings as a subsistence farmer to becoming a renown sweet potato supplier to retailers in Machakos County.



## Choose the right maize variety to plant this season

One of the ways to ensure good yields, is selecting seeds with qualities suited to your climatic region. Below is a list of maize varieties with information on their qualities and favourable climatic conditions.



	VARIETY	OPTIMAL PRODUCTION LEVELS	YIELD (90kg bags/ acre)	SPECIAL ATTRIBUTES	RECOMMENDED GROWING AREAS
Highland Maize Varieties	H6218	-Temperatures During the day seldom exceed 28° C and night drop to as low as 8° C . -Rainfall of between 800 - 1500 mm -Maturity ranges from 160-210 days.	56	Blight tolerant, good husk cover, semi-flint .	These are highland hybrids grown particularly in Trans-Nzoia, Uasin-Gishu, Nakuru, Laikipia, Kisii, Narok, Bungoma, Kakamega, Nandi, and Kericho. Tea zones of central Kenya. Nyahururu, Southern highlands of Tanzania, Mt. Kilimanjaro slopes. Bungoma, Bomet, Nyeri, Kiambu and Meru tea zones, Timau, Nkubu, Nanyuki, Kirinyaga, Igembe, Bukwa, Mbale.
	H6213		52	Tolerant to lodging, ear rot, rust, grey leaf spot (GLS) and leaf blight	
	H6210		50	Tolerant to lodging, ear rot, rust, grey leaf spot, stem and leaf blight.	
	H629		48	Has good husk cover, very tolerant to lodging, ear rot, rust, stem and leaf blight.	
	H628		46	Producer of more than one cob, tolerant to most leaf diseases, blight and rust, tolerant to lodging.	
	H626		42	Tolerant to most leaf diseases, blight and rust, tolerant to lodging.	
	H625		40	Tolerant to lodging, has good husk cover	
H614	38	Tolerant to blight, leaf and ear diseases and weevil attack.			
Lowland, Medium altitude & Transition Maize Varieties	PH1	Rainfall of 800 -1500mm	16	Has better husk cover and can be inter-cropped with other crops.	The Lake region and the Coastal strip, Kilifi, Mpeketoni, Hola, Gariseni, Voi, Mwatate, Kwale, Kinangop
	PH4	Matures between 160 - 210 days	16	Tolerant to most leaf and ear diseases, excellent husk cover and tolerant to lodging.	
	H6243	Rainfall - 800 - 1500mm Temperature range of 12° C - 30° C	32	Tolerant to grey leaf spot, leaf blight and rust, excellent husk cover with flint kernels.	Bungoma, Kakamega, Bumula, Lanet , Nandi, Laikipia, Narok
	H520	Matures at 120 - 130 days	32	Tolerant to leaf rust, grey leaf spot, lodging, has flint kernels and excellent husk cover.	Western Kenya, Elgeyo Marakwet, Coffee growing areas of Central Kenya and parts of Nyanza.
	H517	Rainfall of about 750 - 1000mm	30	Tolerant to foliar diseases and pests. Has an excellent husk cover.	Western Kenya, Elgeyo Marakwet, Coffee growing areas of Central Kenya and parts of Nyanza.
	H516 H522	Matures at 100 -110 days Does well in coffee grown belts.	28 26	Good husk cover, very tolerant to lodging, ear rot, rust, grey leaf spot, Stem and leaf blight.	Western Kenya, elgeyo marakwet, coffee zones of central Kenya, Tharaka Nithi Nyanza (Migori, Kisii, Nyamira), Baringo, Embu, Chuka Lowland
	H515		24	Tolerant to lodging, leaf blight, leaf rust and GLS.	Early to medium transitional zones and lowland areas of Kirinyaga, West Pokot, Bungoma, Homa Bay, Kerio Valley, Kagio, Mwea, Makueni, Kitui, Marakwet, Baringo and Koibatek, Voi, Mwatate, Mariakani, Garissa.
	H513		24	Partially tolerant to maize streak virus	

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	VARIETY	MATURITY (days)	YIELD (90kg bags/ acre)	SPECIAL ATTRIBUTES	RECOMMENDED GROWING AREAS
Dry Land Maize Varieties	DH01	70 - 90	16	Long stay green trait, drought tolerant, good level of tolerance to leaf blight, common rust and ear rot.	Arid and Semi-arid areas of Makueni, Machakos, Kangundo, Siaya, Kibos, Busia, Kibwezi, Kitui, Mwingi, Voi, Mwatate, Makayo, Turkana, Sigor, West Pokot, Isiolo, Mandera, Karachuonyo, Nyando, Kisumu Bondo and some parts of Butere
	DH02	70 - 100	18	Early, tolerant to MSV, water stress, has a long stay green trait.	
	DH03	80 - 120	22	A good level of tolerance to blight and MSV, good husk cover, better standability and drought tolerance.	
	DH04	80 - 120	24	Short, drought tolerant, good husk cover and standability.	Early to medium transitional zones and lowland areas of Kirinyaga, West Pokot, Bungoma, Homa Bay, Kerio Valley, Kagio, Mwea, Makueni, Kitui, Marakwet, Baringo and Koibatek, Voi, Mwatate, Mariakani, Garissa.

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

## Install Jiko Kisasa in your kitchen for clean and efficient cooking

By Pamela Okutoyi

Over the years, households have been using three stone fire set ups in cooking, until some years ago, when other inventions such as gas and electric cookers came around. Despite these inventions, a large population in the rural still use the three stone jikos, due to the high cost of gas as a fuel, and the inaccessibility of electricity. Unaffordability of these alternative methods of cooking, has made it difficult for rural families to move away from using firewood on three stone set up. But, with the evolving times, new technologies that use less firewood and charcoal; and which have minimal smoke emission have been invented and are gradually gaining popularity among rural families. Popularly known as Jiko Kisasa, these cooking systems are efficient in wood use and keep the air in the kitchen clean.

Jiko Kisasa stove saves firewood by retaining heat for a long time. This is unlike the three stone jikos which burn firewood so fast and release a lot of smoke. The stoves come in various types and sizes and use firewood and charcoal. One type can be fixed in the kitchen, referred to as Maendeleo Jiko or Jiko Kisasa and one that is portable and enclosed in a metal, commonly known as the "Kuni mbili Jiko".

### How to make a portable stove

Materials;  
Clay, mud, iron

- Knead the mud-like dough removing any remaining pebbles and stones since they are contaminants that could lead to cracks in the combustion chamber.
- Fill the mud into an iron form creating the walls of the combustion chamber.
- When the walls are ready, cut the opening for the wood fuel.
- When satisfied with the shape of the combustion chamber, carefully put it into the shade to dry for several days.
- Then burn in a kiln to make it stable.

After drying, insert the respective combustion chambers into metal-made stoves.

The cost of liners varies. The price for a wood stove liner is Ksh150. A small liner for a charcoal stove can be

bought at about Ksh25 per piece. A complete stove is sold for Ksh200 or more depending on size.

To build the stove inside your kitchen;

- Mix water with soil to form a clayey mass.
- Use the clay to fix the combustion chamber in the corner of the kitchen.
- Cut exact borders into the mud and smoothen the surface with a little stick.
- Let it dry for some days and will be ready for use.



A portable stove (Kuni mbili) Jiko

<https://infonet-biovision.org/EnvironmentalHealth/Energy-Saving-Cookstoves>



Inbuilt Stove



## Break out of poverty through fruit farming

### Josephat Chengole Mulindo

Human beings are configured to consume plant based diets and very minimal meats. This is based on their dentition and their long winding alimentary canals that are adapted for digesting plant based foods. Among the plant based foods, fruits rank number one on the best human diets. Adequate and consistent consumption of fruits is one sure way of ensuring a long healthy human life. Besides producing fruits for food, fruits have many other benefits including offering a strategic source of income for households. Though not practised as widely as expected by Kenyan farmers, diversification into fruit farming is an avenue for employment generation as farmers get involved in production, processing and marketing activities. Fruit based micro-enterprise, when done right can increase meaningful involvement in agriculture by women and youths and ensure a source of food and income offseason.

Fruit farming primarily involves the production of fruits and nuts for food and sale. Starting a fruit enterprise requires the actor to consider its feasibility. This is because fruits differ in their ecological requirements and market demand. The following are the steps to be taken in starting up a fruit farming enterprise:

#### Select the appropriate fruit for the area

This involves the following considerations:

**Ecological requirements:** Fruits differ in their requirements for soil, altitude,

rainfall and temperature. The table below gives an indication of the ecological requirements for some common tropical fruits grown in Kenya. It is obvious from the information in the table that avocado and banana are the most versatile fruits that can be produced in many parts of the country.

**Market availability:** It is important to investigate the market and only choose to produce the fruit that commands high demand. Closely related to this is the producer price for the fruits – an appropriate price is one that is low enough to generate high demand but high enough to make the fruit farming business profitable.



**You can overlook buying a pixie orange fruit, only if you have never tasted one**

#### Pixie orange

On the basis of ecological requirements and market demand, let us say we select pixie orange for production. One can select any of the other fruits, but pixie orange is picked because currently, it attracts one of the highest market demands in Kenya. Their orange-yellow colour and sweet lingering taste are a magnet for buyers. In fact, it is commonly said that; “you can overlook buying a pixie orange fruit, only if you have never tasted one”. The first step to establishing a pixie orange business is putting down a business plan.

#### Pixie orange business plan

As long as a farmer wants to grow fruits for commercial purposes, then a business plan is a must. In pixie orange production, putting down a business plan is one way of ensuring the enterprise succeeds. It will give you a framework for decision making with clarity based on real situations. Even in seeking for a loan from a financial institution for expanding your enterprise, the business plan comes in handy. Because of space limitations, I will not present a full business plan for pixie orange enterprise. However, it should capture the owners and employees; the costs to be incurred and the expected income, the available resources, and a marketing plan. With a business plan in place, you can move forward to establish the pixie orange orchard.

#### Establish the pixie orange orchard

**Choose a suitable farmland:** The farm should be relatively flat with well drained soils, within reach of a water source and with good sunlight. Prepare the land by ploughing and reploughing based on the weed condition of the farm.

**Excavate holes:** A hole for planting pixie orange should be 0.6 metres wide and 0.6 metres deep. Separate the top soil from the subsoil. Discard the subsoil. Mix the topsoil with 15-20kg of well decomposed farmyard manure and put it back in the hole ready to receive the pixie orange seedling. The holes should be spaced at 4 metres between plants within the line and 4 metres between the rows. In total, 250 holes should be excavated per acre of land.

**Get pixie orange seedlings:** The price of pixie orange fruit seedling is currently Ksh150. If you have technical experience and can access quality pixie orange scions, then you can use rough

lemon rootstock for budding the pixie orange. Each scion goes for Ksh10. You can buy rough lemon seedlings at Ksh50 a piece or raise yours. A kilogram of rough lemon fruits at Ksh70 will provide on average 100 seeds.

**Transplant the pixie orange fruit seedlings:** When the budded pixie orange seedlings attain pencil thickness, they are ready for transplanting. Remove the potting material and place the seedling in the excavated hole. Ensure the top soil – farmyard manure mixture covers the seedling up to the same level it was in the potting material. Sprinkle irrigation water to moisten the soil.

**Manage the pixie orange orchard:** Weed as appropriate and keep the orchard weed free. Mulching can be done to suppress the weeds without too much weeding. Though it has an erect growth habit, the pixie orange tree should be pruned to remove old or deceased branch parts. Manage pests and diseases by use of organic sprays and pepper smoke from fire set at least 2 metres away from the nearest point of the tree crown. To maximize on the returns of the orchard, it is advisable to integrate beekeeping with pixie orange fruit production for improved pollination of the fruit trees. Two bee hives per acre of orchard will

result in more, larger, regularly-shaped and sweeter pixie orange fruits.

#### Post-harvest handling of pixie orange fruits

**Harvest and sale of pixie orange fruits:** When mature, the fruits should be harvested. They can be consumed at home and the rest packaged appropriately for sale. The fruit is yellow-orange coloured and peels easily. When sliced in the middle crosswise, it can be easily squeezed by hand to extract the tasty juice in a glass for consumption. Unlike many other citrus fruits, it is seedless and has a pleasant sweet taste.

**Process the pixie orange fruits:** Processing is one major way of adding value to fruits. Being seedless and juicy, pixie orange fruit can provide high grade juice with little effort. While the price of a pixie fruit is Ksh20, three pixie oranges make 1 glass of pure fresh fruit juice that goes for about Ksh150. That means, one processed pixie fruit will go for Ksh50 (more than double when sold as a whole fruit).

#### Economics of pixie orange fruit production

Pixie orange fruit trees start fruit production in the third year of transplant-

ing. It implies that the first and second years are investment years without returns. The farmer will spend on land preparation, seedling procurement, manure, planting, irrigation and weeding in the first year with zero monetary returns. In the second year, expenditure will be weeding and farmyard manure acquisition and application with no cash returns. In the third year, the farmer will get on average 45 kg of pixie orange fruits per tree. This will continue to increase and in subsequent years, the farmer will get an average of 60kg of pixie orange fruits per tree annually. At Ksh100 per kg and from 250 fruit trees per acre, the farmer will have a gross turnover of Ksh1.5 million annually.

The pixie orange producer breaks even in the third year immediately the trees start fruiting. The gross margins in successive years are in millions implying that pixie orange fruit production is one of the most lucrative agribusiness ventures one can invest in. The farmer may choose to expand into the processing space to more than double the returns. Other benefits include hive products (honey, bees wax and propolis) from the beekeeping venture integrated in the pixie orange production.

Table 2: Costs and income streams from investment in an acre of pixie orange fruits orchard

Year (Yr)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Production (kg/acre)	0	0	11250	15000	15000	15000
Value (KES/acre)	0	0	1.125M	1.5M	1.5M	1.5M
Cost (KES/acre)	75000	5500	5500	8000	5500	5500
Gross margin (KES/acre)	-75000	-5500	1.12M	1.492M	1.492M	1.492M



Table 1: Ecological requirements for selected tropical fruits

Fruit name	Altitude (M. A.S.L)	Mean annual rainfall (mm)	Temperature °C
Avocado	0 - 2500	1000 - 1200	16 - 30
Passion	1200 - 2000	900 - 2000	18 - 28
Papaya	0 - 1600	1000 - 1200	21 - 33
Strawberry	1500 - 2200	1200 - 1500	2 - 30
Banana	0 - 1800	1000 - 2000	20 - 30
Pixie Orange	0 - 2100	750 - 1000	10 - 30
Pineapple	0 - 2000	650 - 3800	20 - 45



## TOF Radio answers farmers' questions

### Yes, you can manage Newcastle disease.

By Charles Kimani

As the Farmer Feedback Officer at Biovision Africa Trust, I am always anticipating calls, even messages on our Tusamezane lines, of farmers inquiring about this or the other. If it is a cow showing strange symptoms, I ensure to link the farmer to a vet who attends to him to satisfaction. Often, I refer farmers to field officers under BvAT's Out-

reach Project, near their home, who visit them to offer firsthand assistance.

Of late, I have been receiving several phone calls from farmers frantically expressing their fear of losing their flock of birds, to a terrifying illness. Patricia Mutheu from Machakos, an avid listener of TOF Radio is one of the farmers that called. “I have noticed that my chickens are having diarrhea, excreting a greenish sometimes blood stained wet droppings, and their eyes are watery and swollen,” she launched into a lamentation the minute I picked her call. I calmed her down and promised to get her a remedy.





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!

Joseph Mbithi our field officer attending to farmers in Machakos, is the nearest officer to Mutheu, and on calling him, he acknowledged that there is a Newcastle disease outbreak in his region. Mbithi assured me that he has helped several farmers to manage the illness and that their chickens have survived. Immediately, I knew I had the remedy for Mutheu. After three days, Mutheu called in to say, "thank you, the officer you sent me guided me to the solution and none of my chicks have died."

Newcastle disease can be present in a very acute form with sudden onset and high mortality or as a mild disease with birds experiencing respiratory distress. Sometimes laying hens have a drop in egg production.

Symptoms of Newcastle disease include:

- Sneezing
- Nasal discharge
- Coughing
- Greenish, watery diarrhea
- Depression
- Muscular tremors
- Drooping wings
- Complete paralysis
- Swelling of the tissues around the eyes and in the neck
- Sudden deaths and an increased death loss in a flock
- In laying birds there can be partial to complete drop in egg production; and production of thin-shelled eggs.

It is a deadly infection that can wipe out the whole flock, especially because there is no known treatment to cure it. However, as attested by our field officer in Machakos County, a natural remedy has been used by farmers, to effectively manage the illness. Below are steps to follow in treating your chickens should they exhibit Newcastle disease symptoms:

### Ingredients:

1. Red pepper
2. Ash
3. A litre of water
4. Aloe vera leaf

### Preparation method

- Put a litre of water in a container.
- Add 8 seeds of red pepper.
- Sprinkle in the mixture a tablespoon of wood ash
- Dip into the concoction a freshly cut aloe vera leaf.
- Give to the chicken for three days.

### Prevention is better than cure.

Like in other livestock enterprises when it comes to controlling and managing diseases, prevention in most instances makes the difference. As a farmer keen to avoid the cost and losses that are attributed to diseases, one should follow the following tips.

1. Separate chicks from adult hens except the mother hen.
2. Vaccinate chicks against common diseases and re vaccinate if necessary.
3. Isolate sick birds if necessary and if control measures prove ineffective kill and bury the sick birds.

### How to identify sick chicks.

Characteristics of healthy birds	Characteristic of unhealthy birds
<ul style="list-style-type: none"> <li>• Alert and on guard</li> <li>• Bright eyes and comb</li> <li>• Walk, run, stand and scratch</li> <li>• Continuously eat and drink</li> <li>• Normally lay eggs</li> <li>• Smooth and neat feathers</li> <li>• Soft compact droppings breathe quietly</li> </ul>	<ul style="list-style-type: none"> <li>• Tired and lifeless</li> <li>• Dull eyes and comb</li> <li>• Sit or lie down</li> <li>• Eat and drink less</li> <li>• Lay less or stop laying eggs</li> <li>• Ruffled and loose feathers</li> <li>• Wet droppings with blood or worms, diarrhea</li> <li>• Cough, sneeze and breathe noisily</li> </ul>

### FARMERS FORUM

My name is **Grace Njeri** from Nakuru. I am selling two-month-old pigs. To reach me call **0720 690 672**

My name is **Jonathan Mosbei** from Eldoret. I am selling avocado seedlings. To reach me call **0716 585 353**



To get help with your poultry, talk to us on *Tusemezane*. Call **0715 422 460**. We will link you to an expert.

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

### Partner organizations



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

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